



Biological Evaluation for Threatened, Endangered, Proposed and Sensitive Plants

Southern HDs Landscape Restoration Project

USDA Forest Service
Columbine Ranger District, San Juan National Forest
T34-35N R5-6W

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Introduction

This Biological Evaluation is being prepared for the Southern HDs Landscape Restoration Project and complies with Forest Service Manual (FSM) 2672.4 direction. The objectives of a Biological Evaluation are 1) to ensure that Forest Service actions do not contribute to loss of viability of threatened, endangered, proposed, or sensitive plant and animal species, or contribute to a trend towards Federal listing under the Endangered Species Act, and 2) to incorporate concerns for sensitive species throughout the planning process, identifying opportunities for enhancement and reducing any potential negative impacts.

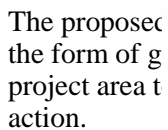
The sensitive species addressed in this document are from the December 18, 2018 Rocky Mountain Region Sensitive Plant list (USDA Forest Service 2018) and include only those species known or suspected to occur on the San Juan National Forest. Federally-listed species addressed in this Biological Evaluation are from the USDI Fish and Wildlife Service Information Planning and Conservation Website, accessed on December 18, 2020 (USFWS 2020).

Project Area Description

The project area is located within La Plata and Archuleta Counties in Colorado. It is located on the southern, western, and eastern flanks of the HD Mountains (Townships 34-35 North, Ranges 5-6 West). It is bordered to the north by Highway 160, by Southern Ute Indian Land to the south, by the Piedra River to the east, and by private land to the west. Topography of the project area is diverse and is divided by numerous drainages, steep rocky cliffs, relatively flat benches, open meadows and rocky south-facing slopes. Elevations of the project area range from about 6,400 feet to 8,700 feet. Ponderosa pine is the dominant tree species in the project area, with Gambel oak the dominant shrub in the understory. There is also piñon/juniper woodland in the lower elevations. In addition, isolated pockets of aspen, Douglas fir, and white fir are interspersed throughout the project area.

The average precipitation within the analysis areas varies between 15-29 inches per year, with the vast majority of that coming in the form of snow with a secondary pulse affiliated with the monsoon season in late summer/early fall. In general, the analysis area consists of moderate to steep slopes, with 9,687 acres or roughly 28% of the analysis area having greater than 35 percent slopes. Portions of this landscape have soil types and geologic substrate that are prone to mass movement and many historic landslides have been previously identified within the analysis area. The analysis area is dominated by Corta Silt Loam, Carracas Loam, Nunn Loam and Sandstone outcrops. Collectively, these four soil types cover over 87% of the project area. Legal description:

Proposed



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individual treatment units would generally be accomplished within one or two operating seasons. Activities could occur year-round.

The proposed action would use Forest system roads, both those open to the public and those that are closed to the public but used for administrative purposes. The proposed action could also require approximately one mile of temporary roads. Temporary roads would be used to drive equipment into treatment units and to facilitate the removal of commercial firewood and other forest products. They would be short-term in nature, would generally not require blading except in isolated spots, and would be rehabilitated after treatment as each applicable treatment unit is finished.

Prescribed fire treatments could encompass the entire proposed project area (35,000 acres) but would be focused on the ponderosa pine stands. Prescribed burning would occur in stages over multiple years. Fire treatment areas could include a variety of burning treatments including broadcast burning, aerial burning, pile burning, air curtain burning, or any combination of these. Prescribed burning also requires the clearing or maintenance of control lines, which would be installed by hand for this project; control lines could also include existing roads, trails, pipeline corridors, natural rock features, or other open areas. These handlines often consist of an area where vegetation is cut and removed of 5-15 feet in width, along with an area where surface fuel is scraped away down to mineral soil of 12-18 inches in width. Support of fire crews would include the use of motorized vehicles such as fire engines, pickup trucks, and off-highway vehicles.

Mechanical treatment areas units would cover approximately 750 550 acres. These forested lands would be thinned to control stand structure and favor desired trees, emphasizing removal of smaller diameter trees. The intent would be to restore stands to a lower overall density (50 to 70 square feet of basal area per acre) with numerous openings interspersed with variable-density clumps of trees. Thinning may be accomplished by a variety of methods which could include rubber-tired or tracked skidders, forwarders, mechanical harvesters, and stroke de-limbers, or hand thinning with chainsaws. Slash generated by thinning operations may be piled and burned, mulched, lopped and scattered, and/or removed for use in biomass utilization facilities for electricity production or other purposes. Public firewood collection and small commercial firewood sales may also occur in these areas.

Mechanical equipment such as a Hydro-mower or Hydro-axe may also be used to masticate (mulch) vegetation within the project area mechanical treatment units. Mastication would include treating Gambel oak and other brush species in a mosaic pattern, creating clumps and openings, removing ladder fuels, creating age class diversity, and changing the vertical arrangement of vegetation. A mosaic of mature oak would be retained within the project area unit to benefit wildlife and create diversity within the vegetation. Treatment boundaries proposed for mechanical thinning were identified as result of on-the-ground field reconnaissance, vegetation type, stand configuration, and topography. Different cover types will be treated with species-specific silvicultural approaches.

Hand Thinning with chainsaws may be used across the project area for specific small-scale purposes, which could include such activities as thinning under desirable “leave” trees to prepare them for fire, or construction of fire control lines.

Managed grazing may be used to establish or maintain fire lines, to remove undesirable densities of Gambel oak and other species, or to remove ladder fuels across the project area. The goat herd would be managed by a herder and/or temporary electric fencing so that vegetation removal would be controlled in duration and intensity. This means of controlling vegetation would most likely be accomplished by goats contracted from commercial sources.

Design Elements

Project activities will follow requirements of existing laws, regulations, and policies, including standard best management practices, Forest Service Handbooks, and Forest Plan guidance. See the Design Elements Section and Appendix A in the Southern HDs Landscape Restoration Project Environmental Assessment for a complete

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list of design elements incorporated into the proposed action. Elements most relevant to at-risk plants in the project area include:

- Watershed
 - Stream course, wetland, spring, and water influence zone buffers will be clearly marked within the treatment units prior to operations.
 - Mechanized equipment is prohibited in buffer zones around streams and wetlands during treatment operations unless the ground is protected by 12 inches of packed snow or 2 inches of frozen soil. Buffer zones are defined as follows unless otherwise determined by a hydrologist: Ephemeral streams – 50 feet on each side; Intermittent streams and springs – 75 feet on each side; Perennial streams 100 feet on each side; and Wetlands 100 feet around the perimeter of the feature. No-equipment buffer zones do not apply to designated stream crossings.
 - Operations shall be conducted to prevent debris from entering perennial or intermittent stream courses. In the event that debris enters stream courses in amounts that may adversely affect the natural flow of the stream or water quality, such debris will be removed as soon as practicable, but not to exceed 2 days during periods of actual or expected flow and in an agreed manner that will cause the least disturbance to the stream course.
 - Do not masticate or cut vegetation that is growing within or on the banks of defined stream channels, gullies or ditches. Do not masticate or cut more than 50% of the vegetation within 25 feet of defined drainages, gullies, ditches, wetlands or ponds.
 - Equipment shall not be operated in stream channels except to ford at crossings designated by the Forest Service. Cross perpendicular to the direction of flow and do not cross where banks exceed 30% slope.
 - Do not encroach road fill or introduce soil into streams, swales, or riparian areas during implementation of any proposed projects.
 - Proper drainage will be constructed or reconstructed on existing and temporary roads that would be used during vegetation treatment operations. Road-stream crossings and dips through habitually wet areas on Forest Service roads open to motorized public use would be hardened. All drainage structures on roads would be inspected at the completion of the project to make sure they are in good condition and functioning properly. Blading roads that are currently well vegetated with grass would be minimized as much as possible.
 - Keep log landings and skid trails out of Stream Management Zones, swales, and parks. Locate and construct log landings in such a way to minimize the amount of excavation needed and to reduce the potential for soil erosion. Design landings to have proper drainage.
 - Skid trails will be located perpendicular to slope angles (along the contour) as much as possible. Avoid creating a dendritic runoff pattern. Do not skid up and down drainage bottoms. As needed, install waterbars or outslope and spread slash on skid trails upon completion of use. Skid trails shall be rehabilitated upon completion of use by returning them to the original grade, water barring, spreading slash and/or seeding as necessary.
 - Landings shall not be placed within 100 ft. of perennial or intermittent streams. Landings shall be rehabilitated upon completion of use by ditching and/or sloping to permit water to drain and spread. Cut and fill banks around landings shall be sloped to remove overhangs and otherwise minimize erosion. Landings will be ripped or scarified and seeded.
- Soils
 - When soils are saturated, equipment operations will cease until the ground dries out or freezes. Soils are considered saturated when ruts created by equipment are four inches deep beyond the lug tread of the tire for ten feet or longer. Limit equipment operations to sustained slopes less than 40%. Limit soil disturbance to less than 15% of the treated area.

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- Slash generated by the project should be piled in most areas for later burning. In some areas with a low density of slash, it may be scattered over the ground surface and not exceed 6 inches in depth
- Operate heavy equipment only when soil moisture is below the plastic limit or protected by at least 12 inches of packed snow or 2 inches of frozen soil. Soil moisture exceeds the plastic limit if the soil can be rolled into 3 mm threads without breaking or crumbling (FSH 2509.25 Chapter 10 management measure 14.1 Design Element 1b).
- At least 10% of treatment generated slash should be left on site and distributed throughout the treatment units to help prevent soil movement and provide for nutrient cycling
- Vegetation
 - Do not masticate or cut riparian or wetland species such as willows or cottonwoods
 - Pre-treatment of noxious weeds in areas that may experience ground disturbance (i.e. landings, mastication units, etc.) will be administered before project implementation. All equipment brought into the project area will be cleaned and inspected prior to operating. Post treatment of noxious weeds will be administered upon project completion. Infestations of noxious weeds will be inventoried, monitored and treated as necessary within the project area for a minimum of five years after the project is complete.
 - Identification materials and known locations of special status plant species will be provided to operators and crews so they may avoid unintentionally trampling or uprooting these species. This includes reported locations of Missouri milkvetch and Aztec milkvetch.
 - If Knowlton's cactus (*Pediocactus knowltonii*) is found within the project area before or during implementation, project activities will cease until the Forest Service is notified and mitigation measures are applied.
- Project Access/Visual Quality
 - Cross-country and overland vehicular travel and fire control lines will be rehabilitated as necessary to discourage public use by OHVs.
 - Overland access routes would be temporary in nature, would generally not require blading except in isolated spots, and would be rehabilitated after treatment as each applicable treatment unit is finished.

Review of Federally Listed, Proposed, and Candidate Species

There are two federally-listed endangered plant species with potential to occur on the San Juan National Forest (USFWS 2020) (Table 1). Neither of these are known to occur on the Columbine Ranger District or the project area. Furthermore, there is no potential habitat for either endangered species within the project area.

Table 1: USFWS Federally Listed Plant Species with Potential to Occur on the San Juan National Forest

Species	Status	Habitat Description	Potential to Occur in Project Area (PA)
Knowlton's cactus (<i>Pediocactus knowltonii</i>)	Endangered	Rolling, gravelly hills in piñon-juniper/sagebrush communities at about 6,200 to 6,300 feet elevation. Strongly associated with pea to cobble size gravels (tertiary alluvial deposits of the San Jose Formation) covering a majority of the soil, black sagebrush (<i>Artemisia nova</i>), and occurrence of reindeer lichen (<i>Hypogymnia</i>	No—previous surveys of potential habitat in and around the PA found no suitable habitat; species not known to occur in Colorado

		<i>physodes</i> var. <i>vittata</i>).	
Pagosa skyrocket (<i>Ipomopsis polyantha</i>)	Endangered	Found on barren shale, ponderosa pine, piñon-juniper, or scrub-oak communities on the Mancos Shale Formation. Elevation 6,750-7,775 feet.	No—Mancos shale habitat does not occur within the PA; species not known to occur on National Forest Service lands

Review of Regional Forester Sensitive Species

There are 24 sensitive plant species known or suspected to occur on the San Juan National Forest that were considered for this project. See Table 2 below for a list of these species along with a description of their habitats and potential to occur within the project area. Habitat and distribution for each species was reviewed, and 19 species were then discounted and dropped from further review due to the following reasons: 1) species not expected to occur in La Plata or Archuleta Counties or considered narrowly endemic only to Dolores County; 2) lack of shale soils (Mancos shale in particular); 3) project area elevation not within species' range (see Figure 2), or 4) lack of bogs, fens, or wetland areas (see Table 2).

The five remaining species that have occupied or potential habitat within the project area are:

1. *Astragalus iodopetalus* (violet milkvetch)
2. *Astragalus missouriensis* var. *humistratus* (Missouri milkvetch)
3. *Astragalus proximus* (Aztec milkvetch)
4. *Cypripedium parviflorum* (yellow lady's slipper)
5. *Epipactis gigantea* (stream orchid, giant helleborin)

Geographic data from the Natural Resources Conservation Service and Forest Service Databases was consulted to consider soil characteristics. The analysis area is dominated by Corta Silt Loam, Carracas Loam, Nunn Loam and Sandstone outcrops. Collectively, these four soil types cover over 87% of the project area. GIS data from the Colorado Natural Heritage Program (CNHP 2020) and from the Southwest Environmental Information Network (SEINet 2021) was reviewed to determine known populations of TES species within the project area. Based on these data sources, two Region 2 sensitive plant species are known to occur within the project area: *Astragalus missouriensis* var. *humistratus* and *Astragalus proximus*.

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Table 2: Pre-field checklist of Region 2 sensitive plant species known or suspected to occur on the SJNF.

Species	Habitat	Potential to occur in Project Area (PA)	Determination
Non-Vascular			
<i>Sphagnum angustifolium</i> sphagnum	As floating mats, carpets, and/or hummocks in fens, open mires, sedge fens and muskegs	No—fens do not occur in the PA	No effect
<i>Sphagnum balticum</i> Baltic sphagnum	Abundant in hollows and floating mats in raised bogs and poor fens; low to high elevation	No—fens do not occur in the PA	No effect
Monocots			
<i>Carex diandra</i> lesser panicled sedge	On floating and non-floating mats of peat, at pond edges, on hummocks in open shrub and sedge meadows;	No—fens, ponds, open shrub and sedge meadows do not occur in the PA	No effect
<i>Cypripedium parviflorum</i> yellow lady's slipper	Ponderosa pine, Doug-fir, aspen and spruce-fir forest; on the San Juan has been found in pine/oak stand at 8,000 feet.	Yes —potential habitat may exist in the PA	May affect individuals
<i>Epipactis gigantea</i> giant helleborine orchid or stream orchid	Decomposed sandstone; sandstone seeps; nutrient rich habitats with moisture (springs, seeps, streams); <8,000 feet	Yes —potential habitat may exist in the PA	May affect individuals
<i>Eriophorum chamissonis</i> Chamisso's cottongrass	Montane swamps and bogs at high elevations 10,400-12,000 feet on the SJNF	No—found in elevations higher than the PA	No effect
<i>Eriophorum gracile</i> slender cotton-grass	Sedge meadows and floating bogs in saturated soil to shallow standing water 8,000 – 12,500 feet	No—fens and saturated sedge meadows do not occur in the PA	No effect
<i>Triteleia grandiflora</i> largeflower triteleia	Ponderosa pine forest, 7,900 – 8,000 feet	No—disjunct population occurrence; not expected to occur in La Plata or Archuleta counties	No effect
Dicots			
<i>Aliciella sedifolia</i> (<i>Gilia sedifolia</i>) stonecrop gilia	Alpine; dry, rocky gravelly talus of tuffaceous sandstone. ~12,000+ feet	No—found in elevations higher than the PA	No effect

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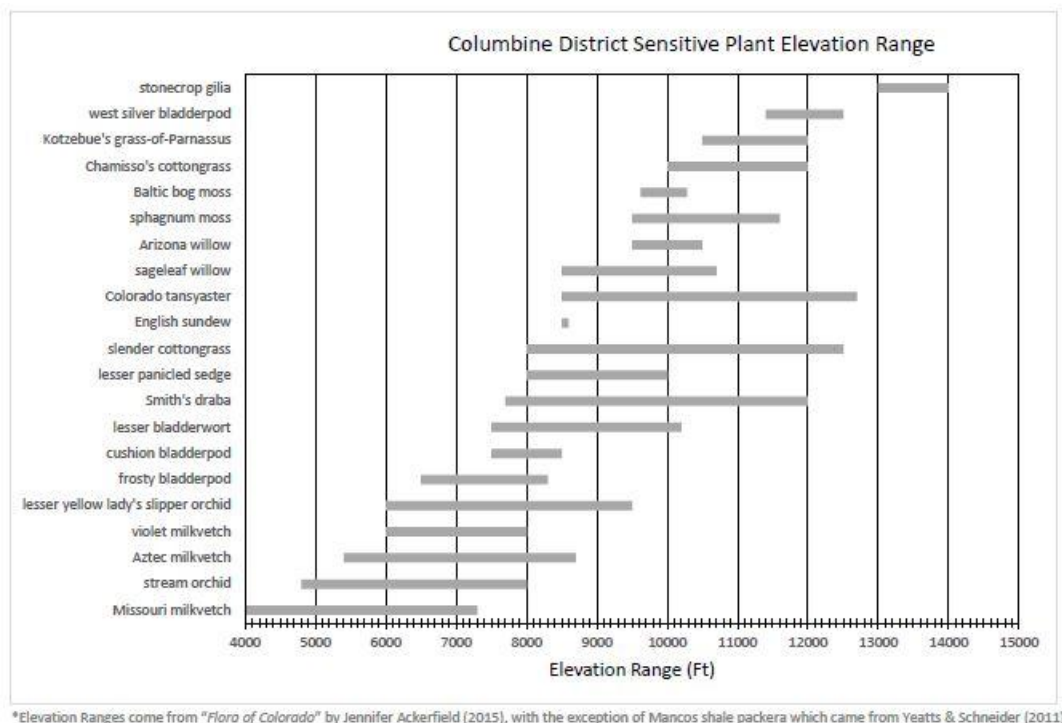
Species	Habitat	Potential to occur in Project Area (PA)	Determination
<i>Astragalus iodopetalus</i> violet milkvetch	dry stony hillsides, commonly on granite, often about oak thickets, in the pinyon-juniper and ponderosa pine zones, in oak-pinyon forests, or among sagebrush; 6,000 – 8,000 feet	Yes —potential habitat may exist in the PA	May affect individuals
<i>Astragalus missouriensis</i> var. <i>humistratus</i> Missouri milkvetch	Flat, shale meadows and on shallow slopes, including roadsides and other disturbed areas. Mancos Shale soils. <7,300 feet	Yes —PA contains a previously surveyed population	May affect individuals
<i>Astragalus proximus</i> Aztec milkvetch	Mesas, bluffs, & low hills in sandy, often alkaline, clay soil in sagebrush and pinyon juniper. Lewis or Mancos shale, 5,400 – 8,700 feet	Yes —PA contains a previously surveyed population	May affect individuals
<i>Draba smithii</i> Smith whitlow-grass	Talus slopes, in crevices and between rocks in shaded protected sites; 8,000-11,000 feet	No—no substantial talus slope habitats at these elevations in the PA and habitat will not be impacted by project activities.	No effect
<i>Drosera anglica</i> roundleaf sundew	On floating and non-floating mats of peat in fens and sedge fens at 7,900 – 8,500 feet	No—fens in the PA	No effect
<i>Gutierrezia elegans</i> Lone Mesa snakeweed	Pinyon-juniper, semi-desert shrubland, sagebrush (barren Mancos shale outcrops) 7,500-7,800 feet	No—considered a narrow endemic to Dolores County	No effect
<i>Lesquerella pruinosa</i> (<i>Physaria p.</i>) frosty or Pagosa bladderpod	Mancos shale; ponderosa pine, Gambel oak; 6,800 – 8,000 feet	No—PA does not contain Mancos shale habitats	No effect
<i>Packera mancosana</i> Mancos Shale packera	Mancos Shale barrens in Dolores County. 7,500 feet	No—considered a narrow endemic to Dolores County	No effect
<i>Parnassia kotzebuei</i> Kotzebue’s grass-of-parnassus	Moist seeps, grassy, wet tundra on thin clay soil, and moist ledges below steep talus slopes; 10,000 – 12,000 ft.	No—found in elevations higher than the PA	No effect
<i>Physaria pulvinata</i> cushion bladderpod	Pinyon-juniper, semi-desert shrubland, sagebrush; barren argillaceous (Mancos) shale outcrops	No— PA does not contain Mancos shale habitats	No effect

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Species	Habitat	Potential to occur in Project Area (PA)	Determination
<i>Physaria scrotiformis</i> West Silver bladderpod	Alpine (barren exposure of Leadville limestone). West Silver Mesa. 11,500-12,000 feet	No—found in elevations higher than the PA	No effect
<i>Salix arizonica</i> Arizona willow	Subalpine wet meadows & streamsides; 10,000 – 11,500 ft.	No—found in elevations higher than the PA	No effect
<i>Salix candida</i> silver or sageleaf willow	On floating mats & in bogs, fens and willow thickets around ponds on wet to saturated, histic soils; 8,800 – 10,600 ft.	No—fens and willow thickets around ponds do not occur in the PA	No effect
<i>Utricularia minor</i> lesser bladderwort	Fens, bogs, edges of ponds, and slow-moving streams at high elevations near 11,000 feet	No—found in elevations higher than the PA	No effect
<i>Xanthisma coloradoense</i> (<i>Machaeranthera c.</i>) Colorado tansy aster	Gravelly soils; subalpine tundra; limestone, dolomite, shale or other calcareous substrates. 9,000 – 11,000 feet	No—found in elevations higher than the PA	No effect

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Figure 2: Elevational ranges of Region 2 sensitive plant species known or suspected to occur on the Columbine RD.



Field Reconnaissance for Sensitive Species

No field surveys or observations were conducted specifically in preparation for this project. A number of past surveys and other data sources were consulted for the best available scientific information regarding the distribution of rare plants in the project area. Sources included data from the Southwest Environmental Information Network (SEINet), the Colorado Natural Heritage Program (CNHP), the U.S. Fish and Wildlife Information Planning and Conservation Website, and internal U.S. Forest Service Data. Additionally, we used known habitat characteristics and models to evaluate potential effects, assuming that habitats may be occupied. However, we note that most rare plant species are not widely distributed and frequently do not occupy all potential habitats. Thus, while any adverse effects to species in the project area may have a disproportionate effect on the regional population, there is a large degree of uncertainty that some species are present at all.

Analysis of Effects and Determination Summary

Threatened or Endangered Species

***Pediocactus knowltonii* (Knowlton's cactus)**

Background: Knowlton's cactus is not known to occur in Colorado, although inaccurate reports of the species occurring in the state are still common in federal, state, and conservation organization literature and websites (Glennie 2013; U.S. Fish and Wildlife Service 2010). However potentially suitable habitat has been identified on

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both private and federal lands in La Plata and Archuleta Counties in southern Colorado (Glennie 2013), including lands managed by the SJNF.

Previous models of potential habitat based on the *Geologic Map of Colorado* (Tweto 1979) used the Modern Alluvium (Qa) and San Jose Formation (Tsj) at 2,050 meters (6,725 ft) and below where Knowlton's Cactus can possibly be located. Based on this model, approximately 154 acres of potentially suitable habitat occur in the southeastern portion of the proposed treatment area. However, surveys for Knowlton's cactus and field reconnaissance of some of the areas considered most likely to contain suitable habitat for this species were done by the USFS on May 9 and 17, 1995. This included Ignacio Creek, Skull Canyon, Goose Creek, Turkey Creek, Spring Creek, and Salt Canyon. No Knowlton's cactus was found during these surveys, and it was determined that these areas did not contain suitable habitat based on the lack of pinyon-juniper-sagebrush communities in these areas and the lack of cobbly riverine alluvial soils (Dickerson 1995). Surveys of potentially suitable habitat have also been done on nearby lands managed by the Bureau of Indian Affairs, but the species has never been found (Friedley 2013). In addition, Knowlton's cactus is known to occur between 6,200 to 6,300 feet in elevation. Elevations in the proposed action range from 6,400 feet to 8,700 feet, and are above the known limits for species.

Determination: Based on previous surveys of area, the known distribution of the species, and our current understanding of its potential habitat, we determine that the proposed action will have “**no effect**” on *Pediocactus knowltonii* (Knowlton's cactus) because neither the species or potential habitat are present in the action area.

***Ipomopsis polyantha* (Pagosa skyrocket)**

Background: Pagosa skyrocket is found only on Mancos Shale soils (Upper Cretaceous period, at elevations between 6,750 and 7,775 feet) in and around the town of Pagosa Springs in Archuleta County (U.S. Fish and Wildlife Service 2011)(USFWS 2011c). Two extant populations occupy approximately 388 acres. The larger of the two populations is found on municipal and private lands in and around the town of Pagosa Springs. The second, smaller population is found on BLM, private, and Colorado Department of Transportation (CDOT) and Archuleta County ROWs near the old town site of Dyke, Colorado, approximately 13 miles to the west of the first population. On August 13, 2012, the USFWS designated approximately 9,641 acres of critical habitat for Pagosa skyrocket, with four units established in Archuleta County (U.S. Fish and Wildlife Service 2012). However, no known populations or critical habitat units occur within or near the proposed action.

Determination: Pagosa skyrocket is not known to occur on NFS lands. No Mancos shale soils, modeled suitable habitat, or designated critical habitat occur in or near the boundaries of the analysis area. As such, we determine that the proposed action will have “**no effect**” on Pagosa skyrocket or its designated critical habitat.

Regional Forester Sensitive Species, Rocky Mountain Region

***Astragalus iodopetalus* (violet milkvetch)**

Habitat: *A. iodopetalus* is a prostrate perennial in the Pea Family, growing from 15 to 20 cm tall with reddish violet flowers and crescent-shaped, glabrous pods. It occurs on dry hillsides and benches, in oak stands, oak-pinon forest, or among sagebrush between 6,000 – 8,000 feet and is often found on granite soils (Ackerfield 2015) (Heil 2013).

Distribution and Occurrences: *A. iodopetalus* is known from southwestern Colorado and northern New Mexico. According to Heil (2013), in the San Juan River Basin, it is locally plentiful and not uncommon around the western and southern slopes of the Rocky Mountains in the valleys of the Dolores, Gunnison, and upper San Juan rivers in southwestern Colorado. It also extends southeast to the western tributaries of the Rio Arriba in New Mexico. There are 2 known locations on the SJNF on the Pagosa Ranger District (SEINet, 2017), including at nearby Chimney Rock. There are no known populations within the project area, but potential habitat may exist.

Direct, Indirect, and Cumulative Effects: Potential effects could include trampling or uprooting of individual plants by tools, vehicles, equipment or foot-traffic. Prescribed fire effects may include sterilization of soils from burning piles or large amounts of slash that have high residence time and high temperatures during burning. Effects from the proposed action are likely to be localized affecting some individuals but not populations. The use of managed grazing by goats also has potential to affect *A. iodopetalus* since it inhabits oak stands which are a potential focus for targeted grazing. However, because we are unaware of existing populations in the project footprint, and because we anticipate managed grazing will focus on small areas, we estimate the risks are relatively low.

Determination: While there are no known populations of *A. iodopetalus* within the project area, because no preliminary surveys were conducted, we assume that potential habitat may be occupied within the project area. As such, we determine that the proposed action “**may adversely impact individuals, but is not likely to result in a loss of viability in the planning area, nor cause a trend to federal listing or a loss of species viability range wide**” for *Astragalus iodopetalus*.

***Astragalus missouriensis* var. *humistratus* (Missouri milkvetch)**

Habitat: *Astragalus missouriensis* var. *humistratus* is found in dry meadows, flat shale meadows, gentle slopes, roadcuts and other disturbed areas. It appears to favor shaley substrates of late Cretaceous to early Tertiary origin. Most sites are on substrates of either Mancos or Lewis Shale, with a few on shales of the Mesa Verde Formation (Decker 2006). This species is broadly associated with ponderosa pine forests or Gambel oak-mountain shrublands.

Distribution and Occurrences: *Astragalus missouriensis* var. *humistratus* is known from just 15 locations worldwide, all within the Upper San Juan Basin in Colorado and New Mexico. There are five known populations on the San Juan National Forest in Archuleta County. The Pine-Piedra trail, which marks the northeastern border of the project area, passes through a population of *A. missouriensis humistratus* as identified by the Colorado Natural Heritage Program Rare Plant Survey for San Juan NF (Lyon 2001) in an area of approximately 8 acres.

Design Criteria and Monitoring: The proposed action includes project design features intended to avoid or reduce impacts to sensitive species. Crews and operators will also be provided with identification materials of special status plant species so they may avoid unintentionally trampling or uprooting these species. In this case, the known distribution of *Astragalus missouriensis* var. *humistratus* in the project area is limited to approximately 8 acres within the treatment area. Providing location and identification information is likely to be effective in helping avoid adverse impacts that could occur from during prescribed fire operations. Additional measures serve to reduce potential impacts from noxious weeds by treating areas of ground disturbance, cleaning and inspecting equipment, on post treatment monitoring (see Appendix A). In general, we anticipate that any adverse effects are likely to be localized and affect individuals rather than whole populations.

Direct, Indirect, and Cumulative Effects: Because *A. missouriensis humistratus* generally occupies openings or on sparsely vegetated soils, prescribed fire may affect some individuals, but poses a relatively low risk to the population. No mechanical treatments, handlines, or new trails are proposed in or near occupied *A. missouriensis humistratus* habitats. However, the known populations occur along the Pine-Piedra trail, which could serve as a control line for prescribed fire operations. Should control line work occur in occupied habitat, potential effects may include trampling or uprooting of individual plants by tools, vehicles, equipment or foot-traffic on occupied sites along the Pine-Piedra trail; however, adverse effects from these activities should be reduced through implementing the design measures described above. Ultimately, the promotion of more open, uneven-aged stand conditions may result in improved habitat for *A. missouriensis humistratus* which makes use of such openings. We do not anticipate adverse effects from the use of managed grazing since *A. missouriensis humistratus* occurs in open habitats that will not be targeted in reducing ladder fuels. Additionally, known populations will be avoided.

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Determination: Since there are potential direct and indirect effects and potential habitat was not surveyed at the appropriate time of year, it is assumed that the species may be present. Therefore, we determine that the proposed action “**may adversely impact individuals, but is not likely to result in a loss of viability in the planning area, nor cause a trend to federal listing or a loss of species viability range wide**” for *Astragalus missouriensis* var. *humistratus*.

***Astragalus proximus* (Aztec milkvetch)**

Habitat: Aztec milkvetch occurs along mesas, bluffs, and low hills in sandy, often-alkaline soils derived from Lewis shale or Mancos shale, Aztec milkvetch grows among junipers or sometimes sagebrush (Spackman, 1997). Other associated species are ponderosa pine, Gambel oak, rabbitbrush, indian ricegrass, yellow sweet clover and antelope bitterbrush (CNHP, 1994).

Distribution and Occurrences: *Astragalus proximus* is known to occur in La Plata and Archuleta Counties in southwestern Colorado as well as in northwestern New Mexico. It is typically found at elevations of 5400 to 8700 feet. The New Mexico Rare Plant Technical Council lists *A. proximus* as common in northwest New Mexico. There is a large population of *A. proximus* at the Chimney Rock National Monument (approximately 850 individuals) to the east of this analysis area. There is a known population of *A. proximus* north of the analysis area just north of Highway 160. Within the proposed action area, previous surveys documented by the Colorado Natural Heritage Program has identified approximately 30 acres of occupied habitat north of the Spring Creek Road in the southwestern corner of the project area (Goshorn 2011).

Design Criteria and Monitoring: The proposed action includes project design features intended to avoid or reduce impacts to sensitive species. Crews and operators will also be provided with identification materials of special status plant species so they may avoid unintentionally trampling or uprooting these species. Additional measures serve to reduce potential impacts from noxious weeds by treating areas of ground disturbance, cleaning and inspecting equipment, on post treatment monitoring (see Appendix A of the Southern HDs Landscape Restoration Project Environmental Assessment).

Direct, Indirect, and Cumulative Effects: *A. proximus* habitat in the project area occurs in semi-desert grasslands and shrublands. While prescribed fire could occur throughout the project area, it will largely focus on ponderosa pine stands. Should prescribed fire reach occupied habitat, it may adversely affect some individual plants. However, because the species is associated with sandy, alkaline soils along sparsely vegetated bluffs, we do not anticipate prescribed fire to affect population viability within the project area.

No mechanical treatments, handlines, or new trails are proposed in or near occupied *A. proximus* habitats. However, the species does occur near the Spring Creek Road which may serve as a control line for prescribed activities. Should overland travel or control line maintenance occur near occupied *A. proximus* habitat, effects could include trampling or uprooting of individual plants by tools, vehicles, equipment or foot-traffic. Indirect effects of fire line maintenance, use of overland travel routes, and other activities associated with the proposed action could increase soil erosion and spread of noxious weed infestations. In general, we anticipate that any adverse effects are likely to be localized and affect individuals rather than whole populations. We do not anticipate adverse effects from the use of managed grazing since *A. proximus* occurs in open habitats that will not be targeted in reducing ladder fuels. Additionally, known populations will be avoided.

Determination: Because there are design criteria in the proposed action which aid in avoiding potential impacts to this species, we determine that the proposed action “**may adversely impact individuals, but is not likely to result in a loss of viability in the planning area, nor cause a trend to federal listing or a loss of species viability range wide**” for *Astragalus proximus*.

***Cypripedium parviflorum* (yellow lady's slipper)**

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Habitat: On the San Juan National Forest, yellow lady's slipper has been found in a ponderosa pine/Gambel oak stand and also in an aspen stand. In other areas it has been found in a variety of habitats including white spruce/paper birch stands, paper birch/hazelnut stands, ponderosa pine/ Douglas-fir forest, spruce-fir forests and mossy woods at seepage zones or streamsides and in bogs.

Distribution and Occurrences: Populations of yellow lady's slipper are scattered throughout most of North America. The species is considered common in the eastern US, but rare in the western mountains. It has been reported from all US states except Nevada, Texas, Louisiana and Florida, and is found in all Canadian provinces. This species has been found in 16 counties within Colorado. Three National Forests within Colorado have occurrences of *Cypripedium parviflorum*, including the Pike San Isabel, Arapaho Roosevelt and San Juan National Forests (USFS, 2003). Surveys from the Colorado Natural History Program record two documented occurrences of *C. parviflorum* on the Columbine Ranger District (Hanson 2005). SEINet records voucher specimens collected from at least seven locations on the district, with the nearest to the project area collected near the Lemon Reservoir dam (SEINet 2021).

Direct, Indirect, and Cumulative Effects: *C. parviflorum* has not been found within the analysis area, and no specific surveys for this species have occurred, but potential habitat could be impacted by fire line construction and activities associated timber sales and mechanical fuels reduction. Potential direct effects include trampling or uprooting of individual plants by tools, vehicles, equipment or foot-traffic. Potential direct effects may include sterilization of soils from burning piles or large amounts of slash that have high residence time and high temperatures during burning. Indirect effects of fire line construction and use of overland travel routes could be an increase in soil erosion and spread of noxious weed infestations. The use of managed grazing by goats also has potential to affect *C. parviflorum* since it can inhabit oak stands which are a potential focus for targeted grazing. However, because we are unaware of existing populations in the project footprint, and because we anticipate managed grazing will focus on small areas, we estimate the risks are relatively low. In general, we anticipate that any adverse effects are likely to be localized and affect individuals rather than whole populations

Determination: Fire line construction and maintenance, foot and machine traffic, and activities associated with mechanical thinning may impact individuals of this species. However, this species is distributed across much of the United States and Canada and occurs in many areas not regularly impacted by forest restoration activities. Therefore, we determine that the proposed action “**may adversely impact individuals, but is not likely to result in a loss of viability in the planning area, nor cause a trend to federal listing or a loss of species viability range wide**” for *Cypripedium parviflorum*.

***Epipactis gigantea* (stream orchid, giant helleborin)**

Habitat: Stream orchid occurs in desert, montane, and boreal climates, but is always restricted to nutrient-rich habitats that have a constant supply of moisture from sources such as thermal and non-thermal springs, seeps, and streams.

Distribution and Occurrences: Stream orchid is a pink-flowered orchid found from southern British Columbia through the western United States as far inland as Texas. Previous assessment on the SJNF documented a known location of stream orchid on a hillside seep in a ponderosa pine/Douglas-fir forest at approximately 6,600 feet in elevation (Rocchio et al. 2006) near Lower Piedra Campground, located just east of the project area. SEINet records include several vouchers collected near seeps and springs in the same vicinity (SEINet 2021). While there are no known occurrences of stream orchid within the Southern HDs project footprint, there are numerous seeps and springs, and ephemeral streams; thus, we presume that some could be occupied within the action area.

Direct, Indirect, and Cumulative Effects: Stream orchid is ranked globally as apparently globally secure (G4) by NatureServe and imperiled to vulnerable (S2/S3) in Colorado. While some activities associated with fireline construction and maintenance, overland vehicle or foot traffic, mechanical treatments, and managed grazing have

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the potential to affect stream orchid, we anticipate very little threat to the species as numerous design elements direct activities to avoid streams, seeps, springs, or other wetlands (see Watershed Design Elements).

Prescribed fire may adversely affect some stream orchids should fire reach occupied habitats. However, prescribed fire is applied during weather and fuels conditions that result in lower-intensity burns. Such burns are less likely to impact native plants, especially those that occur in naturally wet areas. Introducing prescribed fire along with some mechanical thinning is likely to reduce the potential for high-intensity or uncharacteristic fire that could degrade soil and watershed condition. Ultimately, we anticipate that the proposed actions will improve overall habitat conditions for stream orchid.

Determination: While we are unaware of any stream orchid populations in the project area, potential habitat could be affected by prescribed fire activities. However, this species is distributed across much of the western United States and Canada and occurs in many areas not regularly impacted by forest restoration activities. Therefore, we determine that the proposed action “**may adversely impact individuals, but is not likely to result in a loss of viability in the planning area, nor cause a trend to federal listing or a loss of species viability range wide**” for *Epipactis gigantea*.

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